National FIFRA Pesticide Consultation: Diazinon, Chlorpyrifos, Malathion RPA/RPM

NOAA FISHERIES

July 17, 2018

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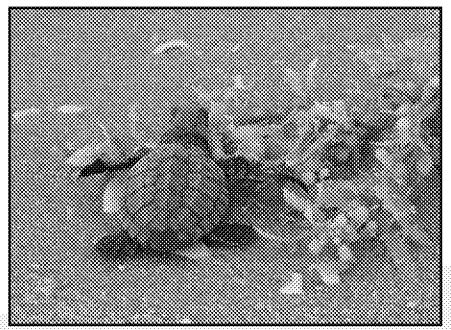
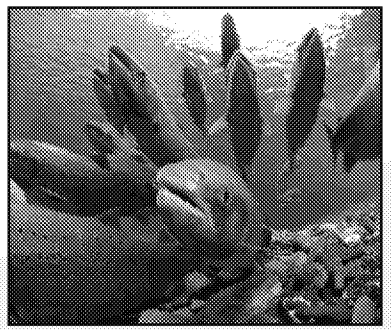
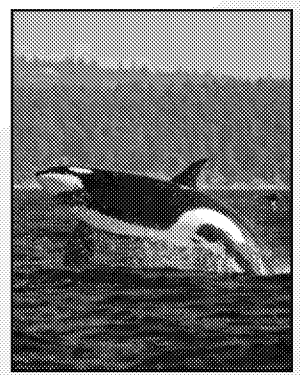




Addressing EPA's Concerns regarding the RPA/RPM

Deliberative Process / Ex. 5

Biological Opinion Conclusions

Species Group	Notes
Salmonids, sturgeon, eulachon	Majority of jeopardies
Cetaceans	Jeopardy for southern resident orca based on reductions in prey
Marine fish	Jeopardy for smalltooth sawfish
Pinnipeds	No jeopardy
Turtles	No jeopardy
Coral and Abalone	No jeopardy
Plants	No jeopardy

Species Analysis (77)

Jeopardy calls:

Chlorpyrifos	=	38
Diazinon	=	25
Malathion	=	38

Critical Habitat Analysis (50)

Adverse Mod. calls:

Chlorpyrifos	=	37
Diazinon	=	18
Malathion	=	37

Defining RPAs, RPMs

Reasonable and Prudent Alternative (RPA)

- Avoids the likelihood of Jeopardy and Adverse Mod
- Consistent with intended purpose of action
- Consistent with the scope of EPA's legal authority
- Economically and technologically feasible

Reasonable and Prudent Measure (RPM)

- Required for both Jeopardy and non-Jeopardy species
- Required to minimize Take
- Include non-discretionary terms and conditions for EPA to be exempt from Take of ESA-listed species

RPA in December 2017 Biological Opinion

"For each active ingredient, the elements of the RPA apply only to the range of the ESUs/DPSs where NMFS has determined that EPA cannot ensure that its registration of that a.i. avoids jeopardy or the destruction or adverse modification of critical habitat (Chapter 25). "

"The RPA and RPM for each of the three pesticides apply to applications on high risk use sites within 300 meters adjacent to, or that drain to listed species aquatic habitats for which jeopardy or adverse modification of designated critical habitat was determined."

High risk uses are those which received a high rating for effect of exposure and a high or medium rating for likelihood of exposure as presented in the Effects of the Proposed Action.

RPA in December 2017 Biological Opinion

Five distinct elements are required to ensure jeopardy is avoided and to ensure designated critical habitat is not destroyed or modified. These elements are:

1. Reduce pesticide loading for high risk use sites;
2. Limit the frequency of application to once per year for persistent pesticides i.e., chlorpyrifos;
3. Limit area of application for mosquito control;
4. Limit area of application for wide area use;
5. Employ an effectiveness monitoring plan.

1. Reduce pesticide loading for high risk use sites.

Choose 1(a) or 1(b) or 1(c).

1(a) Remove label authorization for all high risk uses. If current usage on use sites effectively reduces exposure*, modify labels to reflect current usage.

1(b) Modify labels to include standard buffers and vegetative filter strips: 300 meter no-spray buffer for all aerial applications; 150 meter buffer for all ground applications; 6 meter vegetative filter strip for all applications.

1(c) Point System. Implement a combination of risk reduction measures to reduce pesticide drift, runoff, and drainage.

**Requires NMFS concurrence that EPA-proposed alternative based on usage information effectively reduces exposure*

1. Reduce pesticide loading for high risk use sites.

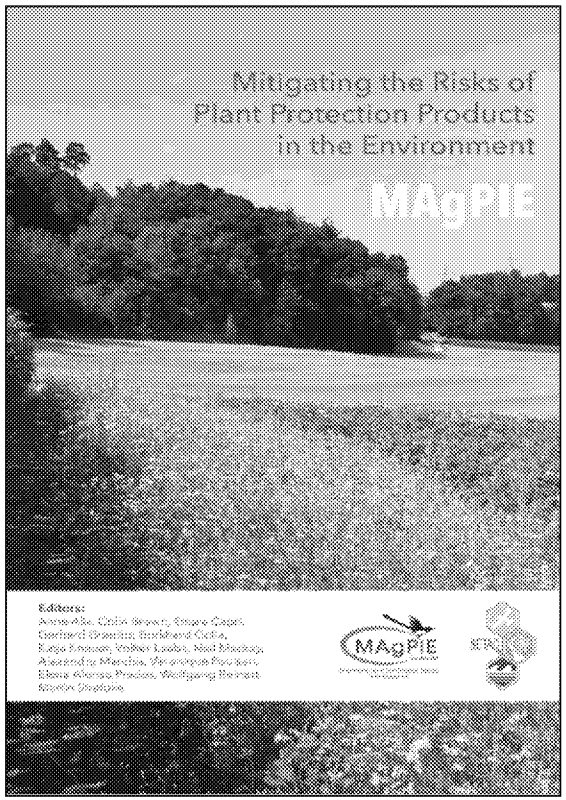
1(c) Point System. Implement a combination of risk reduction measures to reduce pesticide drift, runoff, and drainage.

The "point system" is based, in part, on the European Union's Mitigating the Risks of Plant Protection Products in the Environment, referred to as MAgPIE (Alix et al. 2017).

- Each risk reduction measure on the list has a point value based on its effectiveness at reducing loading from drift and runoff/drainage.
- The applicator can choose which risk reduction measures to implement as long as the required number of points are achieved for each exposure pathway (drift and runoff/drainage).
- The point system – like the rest of the RPA – is only required for high risk uses.

Addressing EPA's Concerns regarding the RPA/RPM

"An element of the RPA is based on a European system (MagPIE), which EPA has not evaluated for use in the U.S. pesticide regulatory context"



- Review of existing runoff mitigation measures and their effectiveness
- Recommendation for method of calculating the overall mitigation effectiveness of combinations of risk mitigation measures.
- See Chapter 4 of MAgPIE

Point System (1c): A Beneficial Approach for Pesticide Applicators

Flexible:

Applicators select what works for them

Feasible:

Based on current practices

Efficacious:

Based on comprehensive report that summarized risk reduction measures' efficacy at reducing pesticide loading (MAgPIE)

Species and Pesticide Specific:

FIFRA Enforceable Label: Directs applicator to EPA's Bulletins Live website which will maintain the geographically-specific requirements (risk reduction only required within species range).

Addressing EPA's Concerns Regarding the RPA/RPM

Deliberative Process / Ex. 5

1. Determine the % reduction in exposure for drift and for runoff/drainage necessary for high-risk uses.

2. Determine order of magnitude reduction in loading needed by using R-plots

3. Consult species and habitat scorecards to evaluate influence of environmental baseline and status of the species.

4. Calculate the number of points needed to satisfy the % reduction needed.

Point System (1c) Example - Malathion

- 80 points in both drift and runoff measures are required to achieve a 99% reduction in malathion loading; 70 points required for 90% reduction.
- Each risk reduction measure on the list has a point value based on their effectiveness at reducing loading from drift and runoff/drainage.
- Applicator chooses which risk reduction measures to implement as long as the required number of points are achieved for each exposure pathway (drift and runoff/drainage).
- The point system is only required for high risk uses.

Table 4 from BiOp Chapter 26: "Malathion Risk Reduction Measures and Associated Points"

Drift Measures	Estimated % reduction in loading	Points	Runoff/drainage Measures	Estimated % reduction in loading	Points
No Spray Drift Buffers:			No Spray Buffer ≥300 meters to listed species habitat or water that drains to habitat	99	80
Ground boom[1] /chemigation buffer:					
10 meters	90	70			
Air blast buffer[2]:					
10 meters	80	60			
20 meters	95	75			
Aerial buffer[3]:					
20 meters	35	15			
100 meters	85	65			
150 meters	90	70			
Spray Drift Reduction Technology[4](nozzles, etc.):			Vegetated filter strip[5]:		
			5 meters	40	20
			10 meters	65	45
			20 meters	80	60
Category one	25-50	20			
Category two	50-75	45			
Category three	75-90	65	Inter row	50	30
Category four	>90	75			
Granular treatment	99	80	Bunds[5]:		
			Edge of field	40	20
			In-field	50	30
Spot Applications <0.1 A[6]	99	80	Spot Applications <0.1A[6]	99	80
			Vegetated ditches[5]	50	30
Riparian plantings[7]	27-36	10	No-till or reduced tillage[5]	50	30
			Retention pond[5]	75	55
Participation in recognized stewardship program	99	80	Participation in recognized stewardship program	99	80
Functional riparian system alongside water ways, > 10 meters wide	99	80	Functional riparian system alongside water ways, > 10 meters wide	99	80

[1] AgDrift Tier 1 Ground Boom – point deposition estimates compared to field edge (1 m buffer). low boom, very fine to fine distribution, 50th percentile distribution.
[2] AgDrift Tier 1 Orchard Airblast – point deposition estimates for sparse orchard compared to field edge (1m buffer).
[3] AgDrift Tier 1 Aerial – Fine to medium distribution, point deposition estimates compared to 25 foot non-CAV aerial buffer.
[4] Range corresponds with EPA star program (https://www.epa.gov/reducing-pesticide-drift-new-certified-drift-reduction-technologies).
[5] MAgPIE 2017
[6] Assumes median field size of 0.278 km² (Lark and Roy 2018)
[7] Washington State Department of Agriculture riparian vegetation pilot study (2015)

RPA: malathion example

Malathion	Risk Reduction Options for High Risk Uses		
Species	**Remove label authorization for all high risk uses**	**No-spray Buffers:** **300m aerial application, or** **150m ground application; and** **6m vegetative filter strip**	**Point System:** **Required Points** **Drift** **Runoff/drainage**
Eulachon, Pacific smelt, Southern DPS (T)	Pasture Developed	Pasture Developed	80 drift 80 runoff
Green sturgeon, Southern DPS (T)	Pasture Developed Orchards and Vineyards Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Other Row Crops	Pasture Developed Orchards and Vineyards Other Crops Corn Vegetables and Ground Fruit Wheat Other Grains Other Row Crops	70 drift 70 runoff

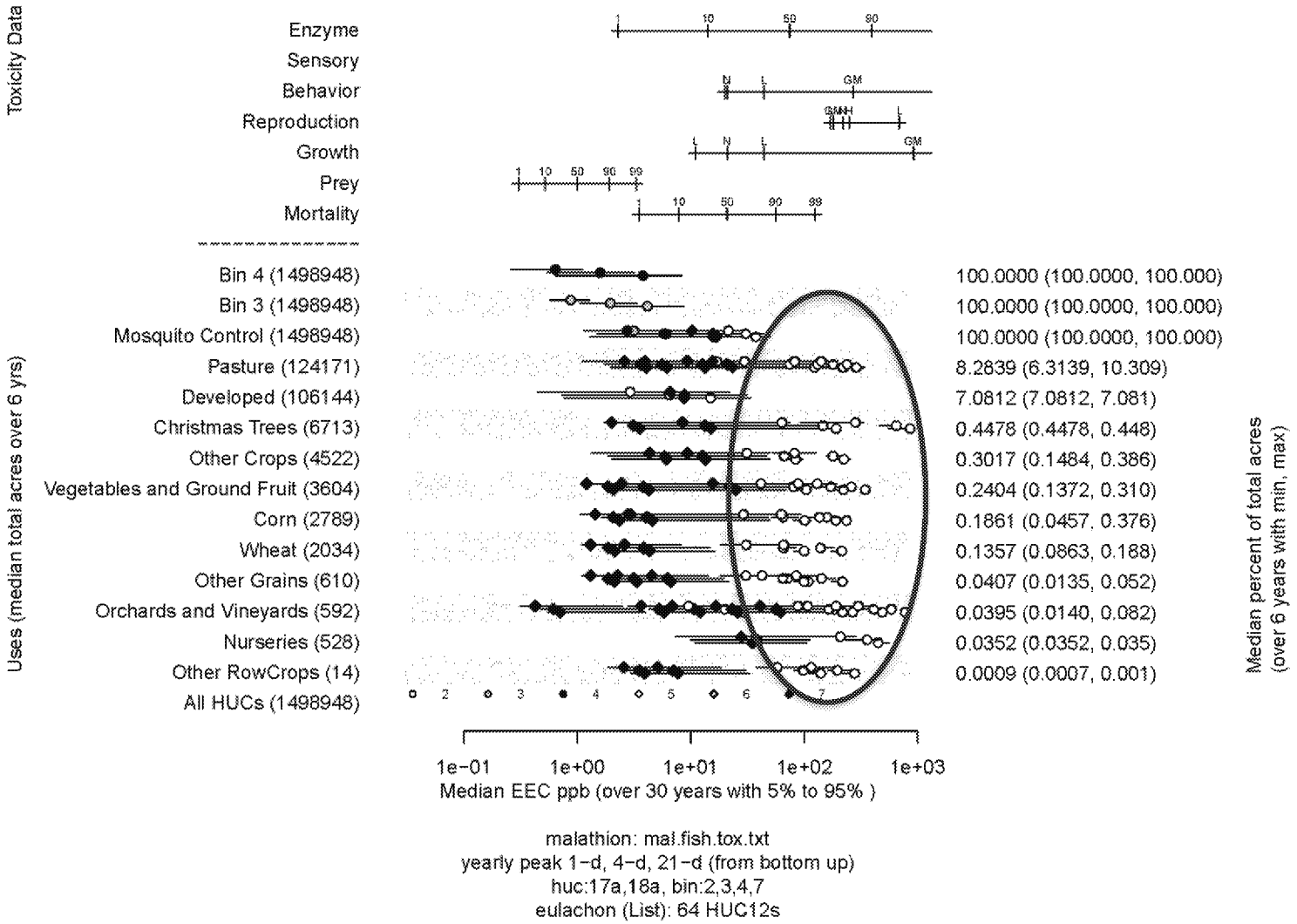


Figure 31 from BiOp Chapter 14: Effects Analysis R-plot for Eulachon, Southern DPS and Malathion

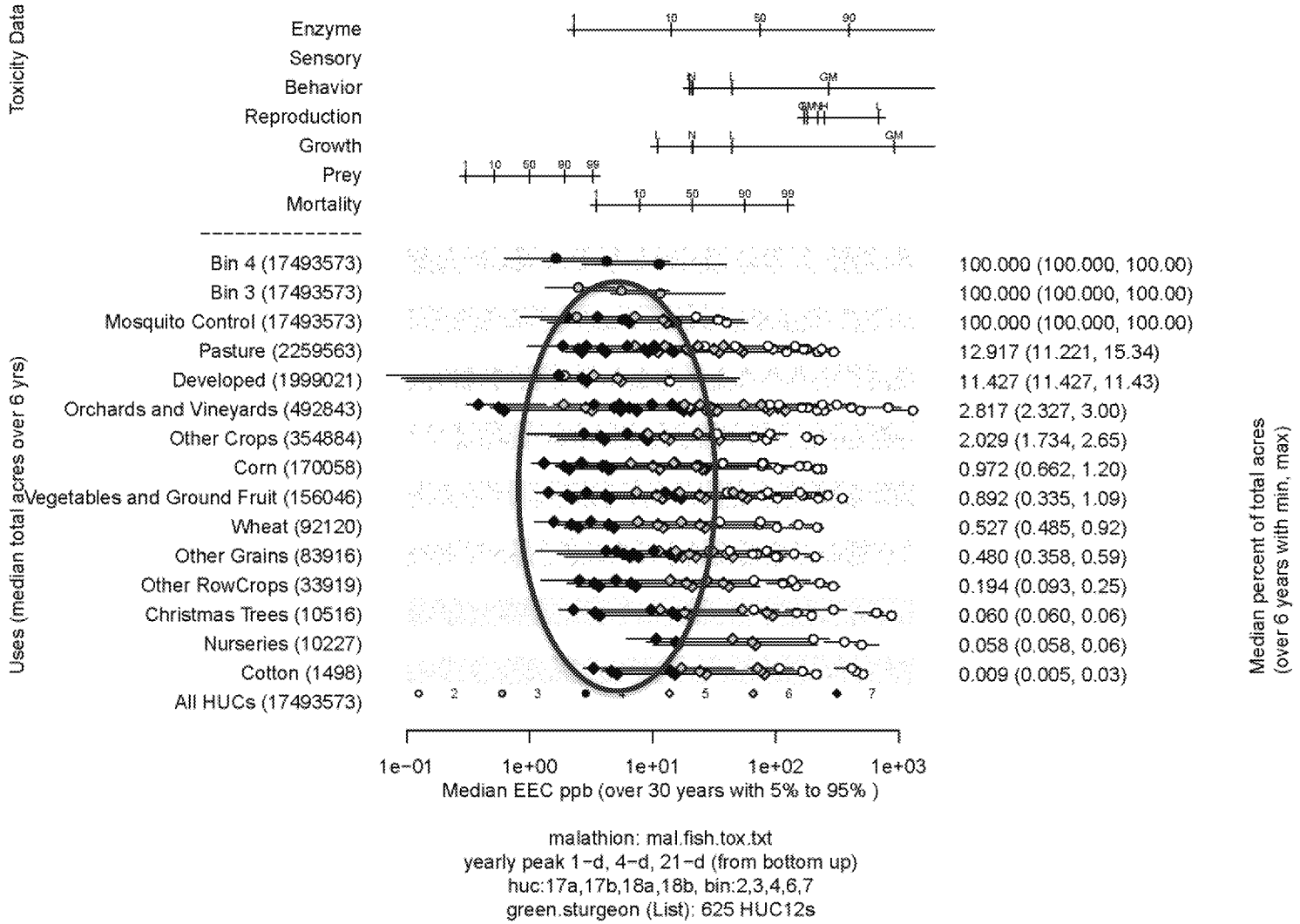


Figure 32 from BiOp Chapter 14: Effects Analysis R-plot for Green Sturgeon and Malathion

RPA in December 2017 Biological Opinion

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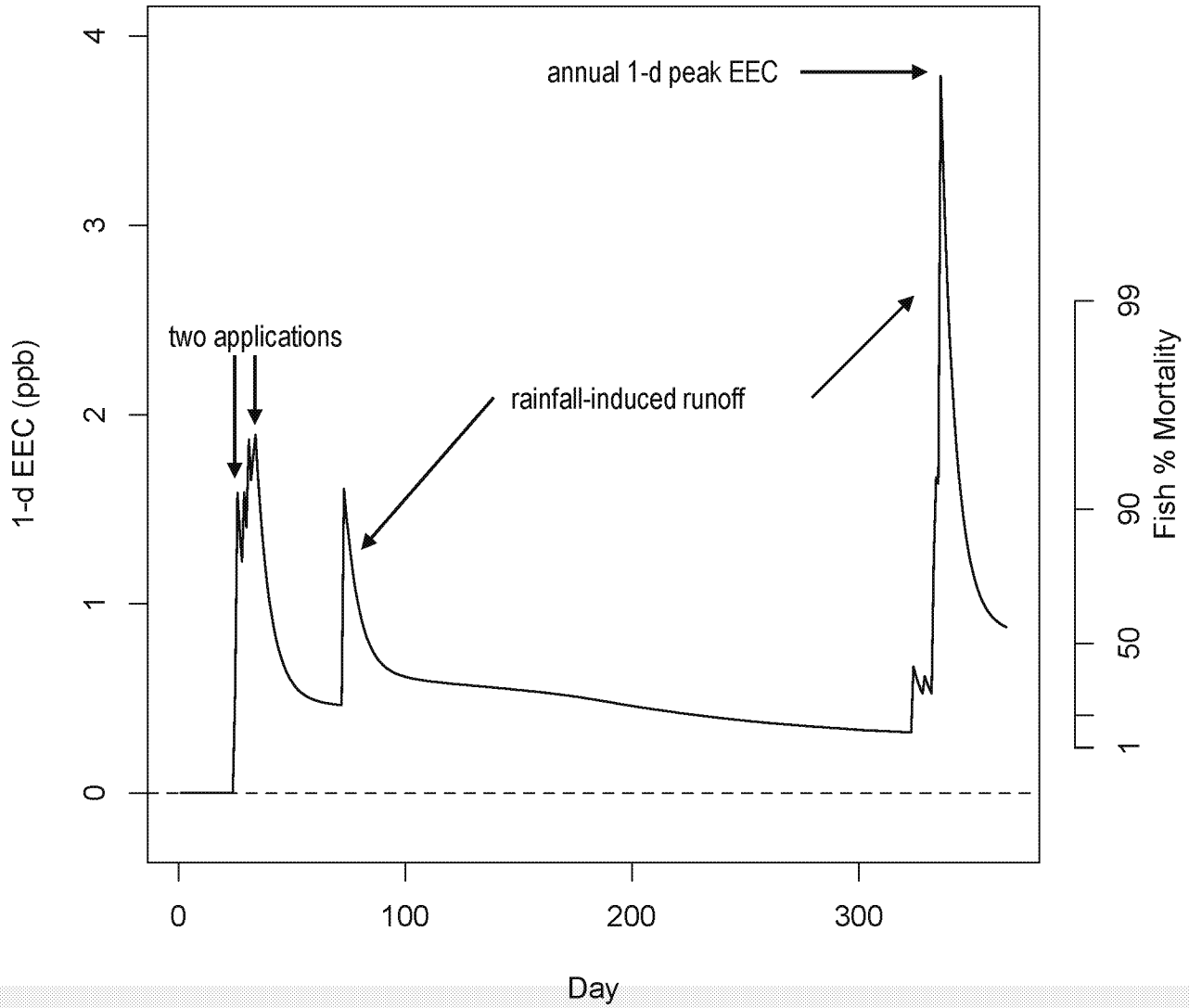
Chlorpyrifos use on Onions (a vegetable scenario) in Western California (HUC18a)
Estimated exposure concentrations (EECs) from drift and runoff to a large water body (bin 7, e.g. lake)
EECs generated by EPA for the Chlorpyrifos BE using the Pesticide Water Calculator



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Incidental Take Statement
Surrogates for Allowable Extent of Take

Category of listed species	Surrogate – The ability of the action to proceed without any:
Anadromous and Marine Fish	fish kills attributable to the pesticide*
Marine Invertebrates	mortality or reproductive effects to corals or mulluscs*
Sea turtles	mortality or sublethal effects to sea turtles*
Pinnipeds	mortality or adverse impacts to pinniped swimming or reproduction*
Cetaceans (SR Killer Whale)	mortality to Pacific Salmonids*

*Applies if observation is within species range and observed effect is considered reasonably attributable to the legal use of the pesticide- e.g. the pesticide was applied in the vicinity, observed effects are supported by environmental concentrations of pesticides, metabolites, etc.

Reasonable and prudent measures (RPM)

1. Revise all chlorpyrifos, diazinon, and malathion product labels and develop relevant EPA Endangered Species Protection Plan Bulletins to conserve listed species.

2. Develop user education program, and incident tracking and reporting system.

Addressing EPA's Concerns regarding the RPA/RPM

Deliberative Process / Ex. 5

See BiOp RPA/RPM section 26.5 Terms and Conditions (page 29)

Terms and Condition:

RPM 1- Require revised labeling and develop endangered species protection bulletins

1. Prohibit application when wind speed ≥10 mph
2. Prohibit application when soil moisture at field capacity
3. Prohibit co-application with other neurotoxic pesticides

Terms and Condition:

RPM 2- Develop user education program and incident tracking, and reporting system:

1. Provide training on endangered species and critical habitat
2. Label modifications requiring applicator incident reporting to EPA, and EPA annual report summarizing incident totals and locations to NMFS.
3. Effectiveness monitoring plan and annual monitoring report
4. Label instructions for incidents involving listed species
5. EPA report requirements for incidents classified as probable and highly probable
6. Commencement date for annual reporting of monitoring results

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END

Questions?

Riparian Systems Alongside Species Habitats

Functional riparian systems benefit aquatic habitats by:

Reducing pesticide contamination, sediment, and nutrients; improving floodplain habitat function by reducing stream temperatures and providing sources of large wood, reducing sedimentation/erosion

Many agricultural areas lack functional riparian systems

RPA and RPM from Previous Biological Opinions

Previous Reasonable and Prudent Alternative (RPA) and Reasonable and Prudent Measure (RPM) in Biological Opinion

- Application restrictions based on field conditions e.g., wind speed and direction; precipitation, soil saturation
- No-application buffers (from 60-1000 ft)
  - Size of buffer dependent on pesticide type, application rate and method
- Vegetative filter strips
  - Size of buffer dependent on pesticide type, application rate and method
- Incentive for establishing and maintaining riparian vegetation alongside salmon habitat
  - Reduced size or waived no-application pesticide buffers